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For the sake of completeness of this double issue on Airborne ASW, the paper written by the Admirals is at the beginning of both issues in order to maintain page uniqueness of a classified journal. The pagination technique of A1, A2, A3, etc. is used. This foreword is repeated to be sure future readers searching for a single issue do not miss the opportunity to see what the Air ASW Board (RADM M. Manazir, RDML M. Carter, RDML C. Jaynes) wrote.

# FOREWORD TO THE AIR ANTI-SUBMARINE WARFARE THEME

Air ASW Board:

RADM Mike Manazir, Director
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RDML Matt Carter, Commander
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(Received April 1, 2014)

We are honored to introduce the Air Anti-Submarine Warfare (ASW) themed compendium for the Journal of Underwater Acoustics (JUA). Together we represent the core enterprise team that guides the Navy's Air ASW community. This enterprise team, or Triad, consists of the Resource Sponsor (OPNAV N98), the Warfighter (CPRG), and the Provider (PEO(A)). We have laid the foundation for all the key stakeholders that enable the vast continuum of Air ASW capabilities. This triad arrangement serves us well strategically across a variety of mission areas, and when we are focusing on ASW, we have the unique identifier of 'Air ASW Board' (AAB). The AAB is supported by an Air ASW Community of Interest (COI) which provides working level alignment across all Air ASW efforts. Certainly, as the future will likely include new ASW challenges, our enterprise team will morph as necessary to ensure alignment not only across the air community, but also with the broader Naval ASW community. Regarding our fit into the broader community, the AAB informs the ASW Flag Oversight Board and provides the aviation perspective to the Undersea Domain Lead, Commander Submarine Forces. The aviation community's ASW strengths—speed, search rate, standoff, and lethality—will continue to be of high importance to the Navy's overall ASW capability. In order to address the evolving threat, we must continue to revitalize our ASW warfighting skills, capitalize on the potential of our new platforms, and invest efficiently in technology.

Given more than a decade since the previous Air ASW focused journal, there is much to reflect upon. Three main themes emerge from the last decade relating to the air community's positioning relative to anti-submarine warfare: a shift in focus from overland operations back to undersea warfare, recapitalization of aircraft platforms, and an increasingly lean budgetary environment specifically in the last few years. Meanwhile, the threat landscape has dramatically changed with significant investments by potential adversaries. Not only are there more threats, but many are much more capable both in terms of stealth and lethality. Throw in an emerging unmanned undersea vehicle threat, and you have a recipe for a robust challenge to our Air ASW systems and skillsets.

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The Navy's focus on Central Command operations since Desert Storm and prior to the pivot to the Pacific, though aligned with the needs of the nation, did facilitate the atrophy of our ASW muscles. Absent reasonably frequent engagement with foreign submarines, there is a generation of aviators whose ASW skills have not necessarily been honed to a sharp edge. As younger crews take to the ASW mission set, they potentially face threats unlike those they have previously seen in trainers or exercises. As a result of the extended focus on overland operations, the proverbial ASW database of threat characteristics, behaviors, and lessons learned also needs to be reconstituted. Fortunately, just in the last several years, we have already started turning this corner.

Thankfully, there are new platforms that are helping us turn that corner. Notably, the MH-60R (Fig. 1) and P-8A (Fig. 2) aircraft are state-of-the-art weapon systems specifically designed to conduct ASW operations. The MH-60R Airborne Low Frequency Sonar (ALFS) system and Automatic Radar Periscope Detection and Discrimination (ARPDD) system provide significant capability improvement over legacy platforms. In addition to the P-8A's open architecture, robust communications capability and high reliability, its operator displays and controls add new dimension to legacy ASW systems. Furthermore, the maritime community is on the cusp of fielding a new active acoustic search capability with the Multi-static Active Coherent (MAC) system on P-8A. Even as these platforms are introduced in the fleet, our weapons schools are developing advanced tactics, techniques, and procedures that best exploit these new capabilities against a maturing and elusive threat. Additionally, we are leveraging advances in computer modeling and hi-fidelity simulators to validate these tactics and train aircrews in their employment. Greater reliance on synthetic training is becoming the rule and key to yielding significant cost savings.

Fig. 1 – An MH-60R aircraft deploys its airborne low frequency sonar.
(U.S. Navy released)


Fig. 2 – A P-8A aircraft drops a sonobuoy during a test flight. (U.S. Navy released)

Regarding the change in budget paradigm, the rising costs of sustaining force structure combined with the reality of national, as well as defense, budget constriction is challenging the way the ASW community attempts to pace the threat. With an eye toward gaining the most from every defense dollar allocated, the focus has been on replacing legacy weapon systems with modern platforms developed as a family of systems which, when employed against today's threats, is more effective than the sum of its individual parts. While completing first increments of existing Air ASW programs such as ALFS, ARPDD, and MAC remained a priority, planning and budgeting for procurement of next generation advanced Air ASW sensors understandably became of lesser priority given the focus on the Global War on Terror and Overseas Contingency Operations. Furthermore, the scarcity of resources has pressurized expenditures on science and technology and the maturation of promising ASW technologies, forcing even greater objective scrutiny when pursuing promising, yet unproven, technologies.

With the context of these three themes, the near to mid-term path for Air ASW is evident. We must continue to revitalize our ASW warfighting skills, capitalize on the potential of our new platforms, and invest efficiently in technology.

With platform procurement and fielding well underway, now is the right time to shift focus to the evolution of payloads and sensors that these platforms employ. Capitalizing on the potential of these aircraft begins with immediate bang-for-the-buck incremental improvements to existing ASW systems. With the emergence of multi-statics, there are a host of relatively inexpensive bolt-on capabilities that have the potential of significantly improving our ASW effectiveness. These incremental improvements include using high duty cycle active transmissions, exploiting the frequency domain to speed search rates, and employing methods to reduce clutter and streamline target recognition. Furthermore, there are a bevy of potential multi-static cooperative engagement strategies to be explored with MAC, ALFS, Multi-Function Towed Array (MFTA), and other sonar systems. These activities represent the modern exploitation of an old ASW capability – active sonar. Emerging super quiet threats challenge the very physics of passive ASW that served as the foundation of our past success. Increasing the role that active acoustic plays in airborne ASW addresses these quiet threats, but this still represents a paradigm shift for some stakeholders with doctrinal and CONOPS implications for all.

Beyond incremental improvements to our current sensor systems, continued funding of ASW S&T efforts is critical to pacing the threat. While fiscal constraints lead us to incremental capability improvements within already developed systems, we must continue to foster maturation of technologies that have potential 'game changing' applications. Though the 'game changing' lexicon may be dated, the driving requirement is upon us. Two distinct emerging platforms will have dramatic impact to the ASW campaign. First, the Unmanned Underwater Vehicle (UUV). There are plenty of examples of systems already in the water, and technologies are certainly ready to support a vast expansion of undersea vehicles to conduct a variety of missions. These vehicles will be small, quiet, numerous, and likely constructed of materials not conducive for our existing ASW sensors to detect, localize, track, and attack. Our science and technology experts will have to adjust their aperture to find new acoustic and non-acoustic means of dealing with this UUV threat. The second emerging platform of interest is the Unmanned Air System (UAS). The Unmanned Air Vehicles (UAV) within these systems expand the realm of the possible with respect to how ASW operations could be conducted. Persistence, range, resilience, expendability, speed of reaction, and potentially affordability are attributes that make UAS attractive in the ASW campaign. UAVs serving to extend the reach and capability of air and surface ASW platforms are already being assessed. Additionally, application of UAVs against a UUV threat seems more of a logical next step than a futuristic excursion.

From an investment perspective within the context of significant budget pressures, emerges the question, "If we only have a dollar to spend, what should we spend it on and why?" This is not a new question. However, the rigor in which we formulate the answer to the question has never been at a higher premium. In the past, it was not uncommon for disparate ASW organizations to conduct various studies, either in house, independent, government, and/or contractor, with the objective of answering this question. Unfortunately, there typically was not a mechanism for these disparate studies or analyses to leverage or comprehend each other much less yield a common set of recommendations. Over the last couple of years, there has been a concerted effort from leadership and stakeholders to ensure robustness of analyses and efficiency, while eliminating redundancy and stove-piping. While there are still growing pains, we have achieved some marked alignment across the broader ASW Integrated Product Team (IPT). OPNAV N81S and the Navy Mine and Anti-Submarine Warfare Center (NMAWC) are forefront in this effort with the technical community rapidly coming on board with the recent focus on Integration and Interoperability (I&I). NAVAIR, SPAWAR, and NAVSEA are partnering in this respect. Under the I&I umbrella, NAVAIR has established the Integrated Warfighting Capabilities (IWC) Enterprise Team to support the delivery of integrated mission level warfighting capability to the warfighter. This includes the establishment of an Air ASW mission area team to produce cross program, Mission Technical Baselines (MTBs) for ASW, which create the foundation for kill chain effectiveness assessments for systems of today and for the future. Ultimately, Air ASW recommendations will flow to the AAB from a broadly informed and aligned organization utilizing vetted and approved processes.

It is absolutely essential that the Air ASW community look at their individual areas of responsibility through an Anti-Submarine Warfare lens and not a platform or a sensor or mission system lens. Identification of capability gaps within the ASW kill chains needs to be rigorous and data driven. Solutions from within the existing portfolio and payload solutions that have real military utility and application to multiple platforms (fixed wing, rotary, UAV) are practically a necessity. The Air ASW community is keenly interested in incremental capability improvements to existing systems as well as the affordable maturation of emerging ASW technologies into systems with real military utility. Ultimately, we seek an affordable integrated ASW warfighting capability.

**RADM Mike Manazir** currently serves as the Director for Air Warfare (OPNAV N98) on the staff of the Chief of Naval Operations (CNO). In this capacity, RADM Manazir is responsible for the development, programming, and budgeting of all U.S. Naval aviation warfighting requirements, resourcing, and manpower. Manazir entered the U.S. Naval Academy from Mission Viejo, California, and graduated in 1981. He earned his Naval Aviation wings in April 1983 and deployed in the F-14A in July 1984. Manazir commanded the Tomcatters of Fighter Squadron 31 (Jun97-Sep98), USS *Sacramento* (AOE1) (Jan03-Jul04), USS *Nimitz* (CVN68) (Mar07-Aug09), and Carrier Strike Group 8 embarked in USS *Dwight D. Eisenhower* (CVN 69) (Sep11-Jun13). As a flag officer, RADM Manazir served as director, Strike Aircraft, Weapons, and Carrier programs on the Chief of Naval Operations Staff (N880) from Aug09-Sep11. RADM Manazir qualified in the F-14A/D and F/A-18E/F aircraft and has flown more than 3,750 hours and 1,200 arrested landings during 15 deployments.

**RDML Matt Carter** is serving as Commander for Patrol and Reconnaissance Group/Patrol and Reconnaissance Group Pacific. He has administrative command of 3 MPR Wings, 16 squadrons, FRS and subordinate activities, providing fully trained, properly manned, and capably equipped, forward deployable MPR forces. Rear Adm. Carter graduated from the Virginia Military Institute in 1985. After being winged as a Naval Pilot, Carter's career has included several operational tours including command tours of VP-26, CPRW-2, and Commander, Patrol and Reconnaissance Force 5th/7th Fleet/Fleet Air Forward. He earned a master's degree at the Naval War College in National Security and Strategic Studies and has served additional tours including Joint Staff, J-3, deputy director for Regional Operations; OPNAV N3, Global Force Management Office; Joint Forces Staff College; and executive officer to the Commander, United States Transportation Command.

**RDML C.J. Jaynes** is serving as Program Executive Officer for Air Anti-Submarine Warfare, Assault and Special Mission Programs (PEO(A)). She has oversight responsibility for nine program offices and seven ACAT I major acquisition programs. She graduated from Indiana University of Pennsylvania in 1979 with a Bachelor of Science degree in Mathematics Education, followed by a Master's degree in Mathematics in 1982. She was commissioned in March 1983 via the Officer Candidate School in Newport, Rhode Island, and was designated an aeronautical engineering (maintenance) duty officer in 1985. She received a Master's in Business Administration from Norwich University in 2008. Jaynes' career has included several operational and acquisition tours including command tours in PMA-202 (Aircrew Systems), PMA-213 (Naval Air Traffic Management Systems), and Commander, Fleet Readiness Centers.

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